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The Impact of Supplier Development on Supplier Performance: the Role of Buyer-Supplier Commitment, Thailand

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Abstract

The objective of this research is to investigate the role of buyer-supplier commitment in supplier performance improvement. This study develops the buyer-supplier commitment based on two dimensions of buyer-supplier relationships and transaction-specific investment that should exist between the two parties. The paper collected data of 174 electrical products and components manufacturers in Thailand and tested relationships by using Structural Equation Modeling (SEM). The findings of this study revealed that the buyer-supplier commitment in dimensions of buyer-supplier relationship played a critical role in supplier performance improvements both directly and indirectly.

Keywords: Supplier development, Supplier performance improvements, Buyer-supplier commitment, Structural equation modeling

1. Introduction

In the intense business competitive environment, companies are relying more on their supply chain as a source of competitive advantage. Purchasing and supply management has achieved a higher level of importance. There is a greater dependence on suppliers (Kannan and Tan, 2002). Suppliers have played strategic roles in organizations, and have significantly engaged in creating a competitive advantage and their actions have a positive impact on the organization's performance (Jabbour and Jabbour, 2009). Many companies faced the problems of supplier's inability to improve themselves (Krause et al, 2000). A number of studies suggested strategies to improve supplier performance. Raising the rate of supplier performance expectations, worldwide sourcing strategy, early supplier design involvement, supplier performance improvement rewards and direct supplier development are suggested to improve supplier performance (Monczka et al ,1993). Krause and Ellram (1997b) defined supplier development as any effort of a buying firm with its supplier to increase the performance and/or capabilities of the supplier and meet the buying firm's supply needs. Supplier development strategies included creating competitive environments among suppliers, supplier assessment, feedback communication, supplier certification programs, promised current and future benefits, site visit and training program (Krause, 1997). The buying firm involved in supplier development programs in order to help the firm meet company's objectives (Krause and Ellram, 1997a). Several studies supported the positive effect of supplier development strategies on buyer and supplier performance improvements (Monzcka et al, 1993; Humphreys et al, 2004; Wagner 2006a; Modi and Mabert, 2007). Additionally, commitment is an important factor between members in the supply chain (Kwon and Suh, 2004; Xiao et al, 2010). Relationship commitment played the significant role in positively impacting co-operative performance in the supply chain (Xiao et al, 2010). Many researches in marketing and supply chain measured the commitment in terms of continuance commitment, affective commitment, normative commitment and behavioral commitment (Kim and Frazier, 1997; Wu et al, 2004; Chung and Rowlinson, 2011; Salam, 2011). Based on the previous work, it was found that buyer-supplier relationship and transaction-specific investment are key elements of buyer-supplier commitment. However, there is little research which has tested the effect of supplier development on supplier performance via the role of buyer-supplier commitment. Therefore, the objective of this study is to examine the role of buyer-supplier commitment by based on buyer-supplier relationship and transaction-specific investment.

2. Literature Review

2.1 Supplier Development

A number of studies have described strategies that buying firms should adopt in order to improve the rate of supplier

performance (Monczka et al, 1993; Vonderembse and Tracey, 1999; Carr et al, 2008; Krause, 1997). Previous researches addressed that organizations increasingly involved in supplier development programs to improve their supplier performance and build competitive advantage (Modi and Mabert, 2007; Alaez-Aller and Longas-Garcia, 2010). Supplier development was defined as any effort of a buying firm on a supplier to increase the performance and capabilities of the supplier to meet the buying firm's short and /or long-term supply needs (Krause and Ellram, 1997b). According to Krause, et al (2000), the supplier development strategies were categorized into two groups as follows;

2.1.1 Externalized supplier development strategies represent externalized activities or indirect supplier development (Monczka et al, 1993) that buying firms employ external market to encourage supplier performance improvements. These strategies encompass with competitive pressure, supplier evaluation and supplier incentives.

Competitive pressure is the strategy to create competition among suppliers in terms of quality, delivery or some area of supplier performance required by buying firms (Modi and Mabert, 2007).

Supplier evaluation is the strategy to effectively evaluate and give feedback on supplier improvements, and ensures the perception of suppliers on their current performance compared with the buying firm's expectations and its competitors as well as motivate suppliers to improve their performance (Modi and Mabert, 2007, Prahinski and Benton, 2004).

Supplier incentives is strategy encourages suppliers to improve their performance including increased business volume, priority consideration for future business, and recognition of good supplier performance in the form of awards or certificate (Monczka et al, 1993, Krause and Ellram, 1997b).

2.1.2 Internalized supplier development strategy which is the direct involvement strategy, represents a direct investment of the buying firm's resources in the supplier or direct supplier development (Monczka et al, 1993). Direct involvement is the strategy to engage buying firms into the supplier development activities such as providing training and education for the supplier's personnel, allocating the buying firm's personnel to the supplier site, having representatives of suppliers in our product design teams (Vonderembse and Tracey, 1999) including investing in capital and equipment in relation to supplier operations (Monczka, et al., 1993) However, according to the previous works, the competitive pressure was not found to be a major factor for improving supplier performance (Krause et al, 2000; Modi and Mabert, 2007). Therefore, this study focuses on the externalized or indirect supplier development strategies, including supplier evaluation and supplier incentives.

2.2 Buyer-Supplier Commitment

Various literatures studied and explored the commitment in relationship marketing and supply chain management. Commitment is defined as a desire to develop a stable relationship, a willingness to make short-term sacrifices to maintain the relationship, and a confidence in the stability of the relationship (Anderson and Weitz, 1992). Business partner plays an important role to maintain the ongoing relationship for long-term success (Morgan and Hunt, 1994). The supplier considers the relationship as a long-term partnership with loyal business partner (Prahinski and Fan, 2007). Therefore, it is considered to be very important for the supplier to continue business operations with the commitment of meeting or even exceeding the buying firm's needs (Prahinski and Benton, 2004). Based on several literatures, each commitment type is mainly measured in terms of emotional and continuance relationship, for example, the study of Wu et al (2004) measured the commitment between partners based on affective commitment, continuance commitment and normative commitment. However, there have been few investigations on buyer-supplier commitment based on two dimensions; buyer-supplier relationship and transaction-specific investment. There are several studies which linked the relationship between commitment and buyer-seller relationships. According to Ellram (1991), a partnership was defined as a mutual, ongoing relationship involving commitment over an extended period of time, and a sharing of information and rewards of the relationship. This means exchange partners need to share mutual benefits in business development for a long-term partnership. The buying firm and its partner are committed to work together to improve the quality, reduce the cost, and improve the reliability of the products they supplied (Burnes and New, 1996). Therefore, business partners are committed to make continuous improvement in all related activities (Burnes and Whittle, 1995). However, the commitment was also based on the development of transactional-specific investment (Williamson, 1985). Specific investments by buyers encourage suppliers to have commitment in business relationship (Ghijsen et al, 2010). The buying firm needs to play a significant role and engages human or capital resources to maintain the relationship such as make a direct investment in their suppliers to customized equipment and tools, provide personnel to the supplier's facilities, or specialized training programs. (Li et al, 2007; Dwyer et al, 1987; Krause, 1997; Lai et al, 2005). Therefore, buyer-supplier relationships and transaction-specific investment are the key elements for commitment between buying firms and suppliers.

2.2.1 Buyer-supplier relationship was described in various aspects (Kannan and Tan, 2006). Saccani and Perona (2007)

classified buyer-supplier relationship based on the level of interaction between firms and the level of cooperation between firms. They identified four types of relationships, i.e. traditional relationships (a low level of interaction between firms), operational relationships (effective operational planning, information sharing, and specific techniques for operation performance), project-based partnership (intensive information exchange and cooperation in designing and developing products or processes), and evolved partnerships (a high level of cooperation and interaction activities). Crotts et al (1998) defined three types of buyer-supplier relationships as follows; adversarial (price based competition), interlocken (exclusive members of particular groups), and cooperative (cooperative relationship with a long-term business partners). With reference to the previous studies, the relationship between firms has shifted the focus away from traditional toward collaborative relationship (Carr and Pearson, 1999 and Daugherty, 2011). Building a long-term relationship was critical for mutual business success (Cooray and Ratnatunga, 2001). Long-term relationship between business partners is related to the willingness of both parties to sacrifice their resource and time in supplier development (Krause and Ellram, 1997a). Haugland (1999) suggested that relation investment which referred to the emotional attachment of buyer-supplier relationship was essential for building a long lasting relationship. This means that the buying firm desires to develop the key supplier who is willing to continue in long-term business relationships. Cannon and Perreault (1999) defined information exchange as expectations on information sharing that may be useful for both parties, including relevant cost information and supply forecasts. The information exchange acts as a relationship connector in a particular buyer-supplier relationship (Cannon and Perreault, 1999). Both buyer and supplier were perceived favorably in joint planning, sharing of demand forecasting and exchange of technical information (Ellram and Hendrick, 1995). Intensive information exchanges such as sharing of internal information of cost and quality levels build a good cooperation between buyer and supplier (Sánchez-Rodríguez et al, 2005). Moreover, Campbell (1997) suggested that if buying firm desires to get the benefit of closer relationship with particular supplier, joint problem-solving was the key success factor of buyer-supplier relationship outcomes. Similarly, Claycomb and Frankwick (2010) suggested that joint problem-solving was important to suppliers in expansion phase of buyer-supplier relationship development. The buying firm needs greater assistance and understanding from suppliers when they faced a difficult situation (Ellram and Hendrick, 1995). This means that the buyer recognizes the benefit of cooperative seeking joint solutions between business partners. In addition to create the success of business relationships, Burnes and Whittle (1995) suggested that partnership must have a clear framework for defining cost, price, and profit. Refer to Beyond Monitoring Working Group (2010), both buyer and supplier were suggested to agree on mutual benefit sharing, including cost reduction, reduced risk and increased efficiency and productivity. Therefore, mutual benefit between partners was critical to the success of partnership relations (Ellram, 1991). These are important considerations as building cooperative relationship between buyer and supplier.

2.2.2 Transaction-specific investment was defined as a buyer's direct investment in human and physical asset specificity (Humphreys et al, 2004). Similarly, Li et al (2007) classified the transaction specific investment into two categories. First, the buying firm invests directly to the particular supplier. Second, the buyer invests in supplier training or providing technical support to the supplier. In addition, the buying firm also invests in adaptations in the process, product, or procedure specifically for the particular supplier (Cannon and Perreault, 1999). For example, Xerox required adaptations of production lines for specific supplier in order to enhance their performance (Heide and Stump, 1995). Suppliers are unable to improve themselves (Krause et al, 2000). Therefore, human supports by the buying firm are mainly critical for supplier performance. Several studies suggested that the buying should engage in personnel assistance for specific supplier; such as conducting training programs, providing technicians for the supplier plant or implementing the site visit (Krause et al 2000; Humphreys et al, 2004; Krause and Ellram, 1997b; Hartley and Choi, 1996).

More specifically, this study defined buyer-supplier commitment as a long-term relationship between the buying firm and the supplier in engaging their human or capital resources to enhance mutual business development. Therefore, buyer-supplier commitment is categorized into two dimensions. First, buyer-supplier relationship refers to the buying firm's degree of effort to have a long-term relationship with their supplier (Anderson and Weitz, 1992; Morgan and Hunt, 1994; Cooray and Ratnatunga, 2001; Krause and Ellram, 1997b; Haugland, 1999), including information exchange (Ellram and Hendrick, 1995; Sánchez-Rodríguez et al, 2005), benefit sharing (Ellram,1991), and joint problem- solving (Campbell, 1997; Claycomb and Frankwick, 2010; Ellram and Hendrick, 1995). Second, transaction-specific investment refers to the buying firm's effort to develop their supplier by engaging in human and capital resources which includes direct investment in equipment and tools (Li et al, 2007), specific adaptations to particular suppliers (Kampstra et al, 2006; Heide and Stump, 1995; Cannon and Perreault, 1999), technicians support at the supplier site (Li et al, 2007), and specialized training (Krause, 1997)

2.3 Supplier performance

According to a number of studies, supplier performance is measured by various criteria. Several key competitive factors

were broadly used to assess the supplier performance. For examples, product quality, delivery performance, price, physical distribution, services, flexibility, relationships are considered to be important factors for measuring the supplier performance (Simpson, et al. ,2002; Prahinski and Benton, 2004; Modi and Mabert, 2007; Humphreys et al, 2004; Gil and Ramaseshan, 2007). The supplier performance improvement was used as the key indicator for the success of supplier development strategies (Watts and Hahn, 1993). Based on the review of previous work and field interview with the purchasing managers in electrical components industry, this study focuses on buyer's perception on the supplier's improvement in the aspects of cost, quality, and delivery which are the critical supplier improvement areas.

3. Conceptual model and hypotheses

3.1 Linking supplier development strategies and buyer-supplier commitment

This study focuses on the following two dimensions of buyer-supplier commitment: Buyer-supplier relationship and transaction specific-investment. According to Krause et al (2000), supplier development strategies positively impact on the direct involvement which refers to a transaction-specific investment by the buying firm (Williamson, 1985). Therefore, the buying firm can use supplier evaluation feedback and rewards to improve the supplier performance via asset specificity; such as the direct investment in tooling and equipments, dispatch of technicians to serve specific supplier, as well as specialized training (Li et al, 2007; Dwyer et al, 1987; Krause, 1997; Lai et al, 2005). This result corresponds to the observation of Wagner (2006b) that indirect supplier development plays critical role toward direct supplier development. When the supplier got evaluation feedback from the buying firm for improvements, the firm needs to provide suggestions or personnel to supplier site (Krause et al, 2000; Prahinski and Benton, 2004). Such action of the buying firm motivates the direct involvement of their potential suppliers including financial resources (Wagner, 2006b). Incentives are important to develop and improve supplier performance. The buying firm provides incentives to motivate suppliers who desire for increased volume of business and priority consideration for future business (Krause et al, 2000). Therefore, this supplier is more likely to continue business operations and open their facilities, extend their resources investment, including provide greater commitment in joint knowledge transfer (Modi and Mabert, 2007). Moreover, as a result of competitive pressure, business partners need to have more integrated activities, information, and processes to achieve the business objectives (Spekman and Carraway, 2006).

From a buyer-supplier relationship perspective, supplier development is a key enabler to encourage the high level of buyer-supplier relationship (Krause and Ellram, 1997a). Carr and Pearson (1999) indicated that supplier evaluation systems have a positive impact on buyer-supplier relationship. Therefore, when the supplier is unable to perform as the firm's expectations, the buying firm needs to communicate these problems and clarify the buying firm's objectives for supplier performance improvements. This resulted in more cooperation and commitment to the supplier (Prahinski and Benton, 2004). Wagner (2006a) examined that there is a positive effect of indirect supplier development on supplier relationship improvement. Therefore:

H1. Supplier development is positively related to buyer-supplier relationship

H2. Supplier development is positively related to transaction-specific investment

3.2 Linking buyer-supplier commitment and supplier performance

Direct involvement activities are key enablers to improve the supplier performance. Suppliers are unable to improve by themselves (Krause, et al 2000). Transaction-specific investment in the supplier was considered as an action taken by the buying firm to improve their supplier performance and capabilities (Li et al, 2007). Therefore, the buying firm needs to implement direct involvement activities to enhance performance improvement such as sending engineering personnel to the supplier firm for technical problem solving or specialized know-how training (Krause et al, 2000; Li et al, 2007). The study of Dyer (1996) suggested that transaction-specific investment by the buying firm motivates the supplier performance improvement in production process and cost reduction. Similarly, the studies conducted by Humphreys et al (2004) indicated that transaction-specific supplier development significantly contributed to the buyer-supplier performance improvement. Therefore, specific investment by buying firm motivates the supplier performance. There have been many benefits to form the strong relationships between buyer and supplier. Saccani and Perona (2007) have summarized the potential of partnerships which improved both buyer and supplier performance, i.e. cost reduction, reduced time, lower risks, higher quality, increased customer and supplier loyalty as well as joint investment. Li et al (2007) indicated that effective joint collaboration between the buying firm and supplier has a direct and positive impact on operational effectiveness including product quality and cost. In addition, a closer relationship resulted in more cooperation in production and design between firms in order to reduce or eliminate the non-value added activities (Li et al, 2007). Managing relationships with supplier has positively impacted on the buying's firm performance which reflected to overall product

quality (Kannan and Tan, 2006). Krause et al (2007) found that the commitment between buying firms and suppliers is important to establish performance goals, and provides value to buying firms. Therefore, buyer-supplier commitment is a critical element for supplier performance improvements. Therefore:

H3. Buyer-supplier relationship is positively related to supplier performance

H4. Transaction-specific investment is positively related to supplier performance

3.3 Linking supplier development and supplier performance

The buying firm implemented a supplier development program to motivate their supplier performance and the competitive capability of supplier (Krause and Ellram, 1997b; Li et al, 2007). Various strategies are presented in several purchasing and supply literatures in order to improve the potential supplier. According to Monzcka et al (1993), the suggested strategies included raising supplier performance expectation, early supplier design involvement, direct supplier development as well as supplier performance improvement rewards. Krause and Ellram (1997b) specified a variety of activities to develop supplier performance and/or capabilities which included introducing competition into the supply base, evaluating the supplier through formal and informal channels, raising performance expectations, recognizing good supplier performance by rewarding the increased business volume in the future, training and providing education for the supplier's personnel, and directly investing in the supplier's operation. The results indicated that the suppliers who exceed performance expectations had more intense effort with an emphasis on communication with the supplier in terms of both formal evaluation and feedback, future business rewards, site visits and the supplier's personnel training which reflected to better improvements in on-time delivery, short cycle time and completely received orders. Humphreys et al (2004) examined the relationship between supplier development and performance in Hong Kong electronics industry. The study found that effective communication and supplier evaluation as a part of its infrastructure factors were positively associated with buyer-supplier performance improvements. Wagner (2006a) found that there is a positive effect of indirect supplier development on product and delivery performance improvements. Therefore, supplier development strategies are critical to encourage supplier performance improvements. Therefore:

H5. Supplier development is positively related to supplier performance

3.4 Linking buyer-supplier relationship and transaction-specific investment

According to Heide and John (1990), when the buying firm involved in joint activities with their suppliers, the relationship between buyer and supplier were increased. Joint activities can be viewed as cooperative relationship on particular activities between buyer an supplier such as collaborate with this supplier to eliminate waste in production process (Li et al, 2007). In addition, supplier believed that buying firm invests into specific-investment leading to the disclosure of confidential information (Campbell, 1997). This means when buyer involved in human and resources with a particular supplier, both parties was open sharing of information such as cost and quality information. The study conducted by Humphreys et al (2004) indicated that transaction-specific investment were positively impact to the buyer-supplier relationship improvements. Similarly, Cambra-Fierro and Polo-Redondo (2011) suggested that investing in specific assets had a positive impact on the level of relationship. Buyer spent time and resources to improve the specific supplier. Therefore, specific investment by the buying firm should ensure a continued relationship with key suppliers (Claycomb and Frankwick, 2010). Therefore:

H6. Transaction specific-investment is positively related to buyer-supplier relationship

4. Data collection and analysis methodology

4.1 The Survey

A survey instrument was developed to collect data for this study. To test all hypotheses, all data is collected through interview questionnaire surveys of Thai electrical appliances manufacturers, Original Equipment Manufacturers (OEM) and component suppliers in electrical appliances business in Thailand. Only current and critical suppliers as defined by the buying firm are going to be selected for this study. Respondents were asked to rate the importance of each items in the list of survey items. The importance of items are measured by a ten-point likert scale (9 = Significant important and 0 = Not important). Respondents were asked to focus on one relationship with one key supplier. According to Thai Export Promotion Department and Industrial Estate Authority of Thailand, the target sample was randomly selected from a list of 1,000 manufacturers in Thai electrical appliances business and the questionnaire was sent to all of them. The survey covers several topics, including supplier development strategies, buyer-supplier commitment and supplier performance measurement. The survey was pretested with four purchasing managers who were asked to review the questionnaire to improve validity and clarity. Minor changes were made to the survey based on the field interviews. A total of 1,000 surveys

were sent by mail and email with hyperlink to the online questionnaire. Finally, a reminder email was sent to the non-respondents 3 weeks after the initial emailing. One hundred and seventy four usable surveys were returned (17.4% response rate).

4.2 Measures

An interview was conducted with purchasing and supply manager who were asked to review scale items, including supplier development strategies, buyer-supplier commitment and supplier performance improvement. Content validity is supported by an extensive review from past literatures, in-depth interviews with four electronics manufacturing executives, which provided insights of electrical products and components supply chain, and a pre-test of the survey by 20 suppliers of electrical products and components industry and two experienced researchers, providing suggestion on wording and format modifications. Based on the field interviews and previous literatures, the measures of supplier development including the supplier evaluation and supplier incentives were developed (Krause, et al, 2000; Modi and Mabert, 2007; Prahinski and Benton, 2004; Monczka et al, 1993, Krause and Ellram, 1997b). Measures for buyer-supplier commitment were developed to extend the scope of relationship commitment to cover the aspect of human and capital investment (Williamson, 1985; Ghijsen et al, 2010; Dwyer et al, 1987; Wagner, 2006b). Supplier performance was operationalized using four measures of performance to reflect operation cost, on-time delivery, delivery time from design until production and number of incoming defects (Simpson, et al. ,2002; Prahinski and Benton, 2004; Modi and Mabert, 2007; Humphreys et al, 2004; Gil and Ramaseshan, 2007).

4.3 Respondent and demographic description

The responding companies represent a number of electrical products and components. Most respondents came from purchasing and supply department (73.6%), due to their most familiar with their suppliers, followed by 23 logistics and supply chain department (13.2%), and 23 others (13.2%). The respondents were employed in a variety of electrical product and component business. Most of the respondents were manufacturers of electronics part for other products (51.8%) including small electronics parts for car and mobile, 54 Air-conditioning and components (31.0%), 18 TV/VDO/Stereo and components (10.4%), 10 refrigerators (5.7%), and 2 radio and components (1.1%). The median length of relationship of 8 years means that the company engages in supplier development and performance improvement with the long-term partnership. Most of the respondents were foreign company (44.8%). Japan's investment was the highest among investors, followed by Taiwan, Germany, and Denmark.

5. Data analysis and results

5.1 Reliability and validity

Current study followed the two-step approach suggested by Anderson and Gerbing (1988). The first step is verified the confirmatory factor analysis and tested the measurement model. If the first step is satisfied the acceptable fit, the second step is involved. Then structural model would be tested the relationships of hypothesis. In this study, convergent validity was assessed by reviewing the level of significance for the factor loadings (Anderson and Gerbing, 1988). The coefficients for all indicators in the four constructs of supplier development strategies, buyer-supplier relationship, transaction-specific investment, and supplier performance with fit statistics indicated a good fit to the data of $\chi^2 = 119.535$, d.f. = 96, goodness of fit index (GFI) = 0.923, comparative fit index (CFI) = 0.979, root mean square error of approximation (RMSEA) = 0.038. These results represent satisfactory evidence of convergent validity. Discriminant validity was based on the recommendations of Fornell and Larcker (1981). The result of the average variance extracted was greater than the square correlation between the constructs which provide support for discriminant validity (See table 1). Cronbach's coefficient alpha was used to access the scale reliability. The Cronbach's alpha values were all above the acceptable level of 0.7 (Nunnally, 1978). In addition, the composite reliability coefficient (CR) for supplier development, buyer-supplier relationship, transaction-specific investment and performance improvements were 0.89, 0.80, 0.81 and 0.80, respectively, exceeding the threshold of 0.6 suggested by Bagozzi and Yi (1988)

5.2 The structural model result

The result of the structural model and path significance is shown in Figure 1 and the fit indices are shown in table 2. Overall, the structural model fit indices provide adequate evidence of a good fit for the proposed model. It is reasonable to conclude that the proposed model has good construct validity. The results of overall fit indices are reported as follows: Chi-square = 117.839, degree of freedom = 97, goodness of fit index (GFI) = 0.925, comparative fit index (CFI) = 0.982, root mean square error of approximation (RMSEA) = 0.035. It can be seen that all indicators reached the acceptable level.

5.2.1 Supplier development, buyer-supplier relationship and transaction-specific investment

When a buying firm applied supplier development strategies to the key supplier, the buyer-supplier commitment can be encouraged in two dimensions; buyer-supplier relationship and transaction specific-investment. The result is confirmed to support hypotheses H1, H2, and the path co-efficient of 0.34 and 0.38 is significant ($p < 0.01$ and $p < 0.001$ respectively) The finding is consistent with the previous study which indicated that supplier development did improve buyer-supplier commitment (Lascelles and Dales, 1989; Krause and Ellram, 1997a; Krause, 1999; Prahinski and Benton ,2004; Prahinski and Fan, 2007). When the buying firm provided assistance to improve their supplier performance, the level of buyer-supplier relationship would be increased. The buying company desires to continue the business with their partner in the long-term by having a good cooperation including important information exchange and joint problem solving. The company needs to define clearly on benefits sharing. Since the buying firm implements supplier development strategies, a greater use of company resources is required such as investing more in machines with customized equipments and tools, and providing training courses for the supplier's skill improvement (Modi and Mabert, 2007)

5.2.2 Buyer-supplier relationship, transaction-specific investment and supplier performance

The previous findings suggested that buyer-supplier commitment is critical to encourage significant supplier performance improvements (Krause et al, 2000; Li et al, 2000, Kannan and Tan, 2006). In support hypotheses H3, the path co-efficient of 0.38 is significant ($p < 0.01$). Buying firms desired to build a long-term relationship with the business partner for the purpose of performance improvement (Krause and Ellram, 1997a, Prahinski and Benton, 2004). However, it was expected that firm investment would not directly impact the supplier performance. The path co-efficient of 0.08 is not significant ($p > 0.05$) and hypothesis H4 is not supported.

5.2.3 Supplier development and supplier performance

Evaluating the impact of supplier development on supplier performance, the path co-efficient of 0.49 is highly significant ($p < 0.001$) providing support for hypothesis H5. This result is consistent with the previous work (Krause et al, 2000; Modi and Mabert, 2007; Prahinski and Fan, 2007). Buyers can specify the weakness of suppliers when they send the feedback to their key supplier. Then, the buying firm can advise and help them on the list which leads to the performance improvements. In addition, suppliers who received the incentives from buyers will be motivated to improve their performance. Hence, supplier evaluation and incentives are important factors for the performance improvements.

5.2.4 Buyer-supplier relationship and transaction-specific investment

The effect of transaction-specific investment toward buyer-supplier relationship was supported by hypothesis H6. The path co-efficient of 0.42 is highly significant ($p < 0.001$). When a buying firm engages in human and capital investment, the level of cooperative relationship between buyer and supplier will be increased (Humphreys et al, 2004: Claycomb and Frankwick, 2010). As a result, the buyer is committed into a relationship with the supplier and desires to have closer business relationship.

6. Managerial Implications and Conclusions

This research investigated the buying firm's efforts to improve their key suppliers. The results revealed that the buying company would implement the supplier development strategies by focusing on buyer-supplier relationship commitment for performance improvement. The findings of this study confirm the general positive impact of supplier development strategies on supplier performance improvements (Krause et al, 2000; Modi and Mabert, 2007; Prahinski and Fan, 2007). The buying firm expected to develop the key suppliers who have long-term relationship with a sharing of information and benefits including joint problem solving. However, the findings of this study indicated that transaction-specific investment by the buying firm would not directly encourage the supplier performance improvement. Based on the results of co-efficient among transaction-specific investments factors, this will also provide the understanding on the nature of Thai electronics manufacturers which preferred investments in human resources to direct capital investments such as providing training courses and sending technicians to the supplier site. Because small and medium enterprises were mostly electronics and components firms in Thailand, this reflects the limitations of capital investment. The result corresponds to the study of Wagner, (2006b), indirect supplier developments are more strongly related to the human support as compared to the capital resources support. Consequently, Human resources are often relatively simple to achieve performance improvements during supplier development program (Hartley and Choi, 1996)

This study tested simultaneously among relationships of structural model. Therefore, we found the relative importance of each factors and relationships. Transaction-specific investment has a significant indirect relationship with performance improvement via buyer-supplier relationship. Buyer-supplier relationship has a direct relationship with performance improvement. Supplier development has both direct and indirect relationship with performance improvement. As a result of this study, the buying firm emphasizes on supplier development for significant improvement of supplier. However, based on

the total effect i.e. direct and indirect effect, both supplier development and buyer-supplier relationship have a greater impact on performance improvement. Specific relationship between partners is like an important facilitator to transform a buying firm's investment efforts into performance improvements. For example, when the buying firm makes decisions to customize the production process for this supplier, supplier needs to share the information about the production schedule, materials components including inventory planning for management. When the company sends technicians or employees to help suppliers improve, it is necessary to have a good cooperative interaction between buyers and suppliers including conducting supplier training program. The results of study provide valuable information for mangers who desired to implement the supplier development strategies. With the arising of competitive environment, companies are increasingly reducing the number of suppliers (Prahinski and Benton, 2004; Maloni and Benton, 1997). Therefore, buyers need a closer relationship with their partners and expect the better performance. Buyer-supplier relationship was suggested to be a major factor for improving supplier performance both directly and indirectly. This is an important finding of this research. Therefore, management should place strong emphasis on developing specific relationship with suppliers. This enables firms to enhance the supplier performance improvements.

References

Alaez-Aller, R. & Longas-Garcia, J.C. (2010). Dynamic supplier management in the automotive industry. *International Journal of Operations & Production Management,* 30(3), 312-335

Anderson, E. & Weitz, B. (1992). The use of pledges to build and sustain commitment in distribution channels. *Journal of marketing research*, 18-34

Anderson, J.C. & Gerbing D.W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two - Step Approach. *Psychological Bulletin*, 103, 411-423

Bagozzi, R.P. & Yi, Y. (1988). On the evaluation of structural equation models. J. Acad. Market. Sci., 16, 74-94

Beyond Monitoring Working Group (2010). Continuous Improvement Partnership Approach. *Beyond Monitoring Working Group Report*, October 2010, Version 1.0

Browne, M. W. & Cudeck, R. (1993). Alternative ways of assessing model fit. In: Bollen, K. A. & Long, J. S. (Eds.) *Testing Structural Equation Models*, 136–162. Beverly Hills, CA: Sage

Burnes, B. & Whittle, P. (1995). Supplier development: getting started. *Logistics Focus*, February.

Burns, B. & New, S. (1996). Understanding supply chain improvement. *European Journal of Purchasing and Supply Management,* 2, 21-30

Cambra-Fierro, J.J. & Polo-Redondo, Y. (2011). Post-satisfaction factors affecting the long-term orientation of supply relationships. *Journal of business and industrial Marketing*, 26(6), 395-406

Campbell, A. (1997). Buyer-supplier partnerships: flip sides of the same coin?. *Journal of Business & Industrial Marketing*, 12(6), 417-434

Cannon, J.P. & Perreault Jr, W.D. (1999). Buyer-seller relationships in business markets. *Journal of Marketing Research*, 439-460

Carr, A.S & Pearson, J.N. (1999). Strategically managed buyer–supplier relationships and performance outcomes. *Journal of Operations Management,*17, 497–519

Carr, A.S, Kaynak, H., Hartley, J.L, & Ross, A. (2008). Supplier dependence: impact on supplier's participation and performance. *International Journal of Operations &Production Management,* 28(9), 899-916

Chung, Y.K.F. & Rowlinson, S. (2011). Supply chain sustainability: a relationship management approach. *International Journal of Managing Projects in Business*, 4(3), 480-497

Claycomb, C. & Frankwick, G.L. (2010). Buyers' perspectives of buyer–seller relationship development. *Industrial Marketing Management*, 252-263

Cooray, J. & Ratnatunga, S. (2001). Buyer-Supplier Relationships: A case study of a Japanese and Western Alliance. *Long Range Planning*, 34(6), 727-40

Crotts, J.C., Aziz, A., & Raschid, A. (1998). Antecedents of supplier's commitment to wholesales buyers in the international travel trade. *Tourism management*, 19, 127-134

Daugherty, P.J. (2011). Review of logistics and supply chain relationship literature and suggested research agenda. *International Journal of Physical Distribution & Logistics Management,* 41(1), 16-31

Dwyer, F.R., Schurr, P.tt., & Oh, S. (1987). Developing buyer-seller relationships. *Journal of Marketing*, 51, 11-27

Dyer, J.H. (1996). Specialized supplier networks as a source of competitive advantage: Evidence from the auto industry. *Strategic Management Journal*, 17(4), 271-292

Ellram, L.M. (1991). Key success factors and barriers in international purchasing partnerships. Management Decision, 29(7), 38-44

Ellram, L.M. & Hendrick, E. (1995). Partnering characteristics: A dyadic perspective. *Journal of Business Logistics*, 16(1), 41-64

Fornell, C. & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *48*, 39–50

Ghijsen, P.W.Th., Semeijn, J., & Ernstson, S. (2010). Supplier satisfaction and commitment: The role of influence strategies and supplier development. *Journal of Purchasing & Supply Management,* 16, 17-26

Gill, D. & Ramaseshan, B. (2007). Influence on supplier repurchase selection of UK importers. *Marketing intelligence & planning*, 25(6), 597-611

Hartley, J. & Choi, T. (1996). Supplier Development: Customers as a Catalyst of Process Change. *Business Horizons*, July-August, 1996, 37-44

Haugland, S.A. (1999). Factors influencing the duration of international buyer-seller relationships. *Journal of business research*, 46, 273-280

Heide, J.B. & John, G (1990). Alliances in industrial purchasing: the determinants of joint action in buyer-supplier relationships. *Journal of marketing research*, 27, 24-36

Heide, J.B. & Stump, R.L. (1995). Performance implications of buyer-supplier relationships in industrial markets: a transaction cost explanation. *Journal of Business Research,* 31(1), 57-66

Hu, L.T. & Bentler, P.M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives. *Structural Equation Modeling,* 6(1), 1-55

Humphreys, P.K., Li, W.L., & Chan, L.Y. (2004). The impact of supplier development on buyer-supplier performance. *The international journal of management science*, 131-143

Jabbour, L.S. & Jabbour, J.C. (2009). Are supplier selection criteria going green? Case studies of companies in Brazil. *Industrial Management & Data Systems*, 9(4), 477-495

Kampstra, R.P., Ashayeri, J., & Gattorna, J.L. (2006). Realities of supply chain collaboration. *The International of Logistics Management*, 17, 312-330

Kannan, V.R. & Tan, K.C. (2002). Supplier selection and assessment: Their impact on business performance. *The Journal of Supply Chain Management: A Global review of purchasing and supply*, 11-21

Kannan, V.R. & Tan, K.C. (2006). Buyer-supplier relationships: The impact of supplier selection and buyer-supplier engagement on relationship and firm performance. *International Journal of Physical Distribution & Logistics Management,* 36, 755-775

Kim, K. & Frazier, G. (1997). Measurement of distributor commitment in industrial channels of distribution. *Journal of business research,* 40, 139 – 154

Krause, D.R. (1997). Supplier development: Current practices and outcomes. *International journal of purchasing and materials management,* 12-19

Krause, D.R. (1999). The antecedents of buying firms' efforts to improve suppliers. *Journal of operations management,* 17, 205-224

Krause, D.R. & Ellram, L.M. (1997a). Critical elements of supplier development: the buying firm perspective. *European Journal of Purchasing and Supply Management*, 21-31

Krause, D.R. & Ellram, L.M. (1997b). Success factors in supplier development. *International Journal of Physical Distribution & Logistics*, 27(1), 39-52

Krause, D.R., Handfield, R.B., & Tyler, B.B. (2007). The relationships between supplier development, commitment, social capital accumulation and performance improvement. *Journal of Operations Management*, 528-545

Krause, D.R., Scannell, T.V., & Calantone, R.J. (2000). A structural analysis of the effectiveness of buying firm's strategies to improve supplier performance. *Decisions Sciences*, 31, 33-55

Kwon, I.-W.G. & Suh, T. (2004). Factors affecting the level of trust and commitment in supply chain relationships. *Journal of Supply Chain Management*, 40(2), 4-14

Lai, K., Cheng, T.C.E., & Yeung, A.C.L. (2005). Relationship stability and supplier commitment to quality. International *Journal of Production Economics*, 96 , 397-410

Lascelles, D.M. & Dales, B.G. (1989). The buyer-supplier relationship in total quality management. *International Journal of Purchasing and Materials Management*, 25, 10-19

Li, W., Humphreys, P.K., Yeung, A.C.L., & Cheng T.C.E. (2007). The impact of specific supplier development efforts on buyer competitive advantage: an empirical model. *International of Production Economics,* 106, 230-247

Maloni, M. J. & Benton, W. C. (1997). Supply Chain Partnerships: Opportunities for Operations Research. *European Journal of Operational Research*, 101(3), 419-429

Modi, S.B. & Mabert, V.A. (2007). Supplier development: Improving supplier performance through knowledge transfer. *Journal of operations management*, 25, 42-64

Monczka, R.M., Trent, R.J. & Callahan, T.J. (1993). Supply base strategies to maximize supplier performance. *International journal of physical distribution & logistics management*, 23(4), 42-54

Morgan, M.M., & Hunt, S.D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58, 20-38

Nunnally, J. C. (1978). *Psychometric methods*. (2nd ed.). New York: McGraw-Hill.

Prahinski, C & Fan, Y. (2007). Supplier Evaluations: The role of communication quality. *The Journal of Supply Chain Management: A Global Review of Purchasing and Supply*, 16-28

Prahinski, C. & Benton, W.C. (2004). Supplier evaluations: communication strategies to improve supplier performance. *Journal of Operations Management* 22, 39–62

Saccani, N. & Perona, M. (2007). Shaping buyer-supplier relationships in manufacturing contexts: design and test of a contingency model. *Journal of Purchasing and Supply Management*, 13(1), 26-41

Salam, M.A. (2011). Supply chain commitment and business process integration: The implications of Confucian dynamism. *European Journal of Marketing*, 45(3), 358-382

Sánchez-Rodríguez, C., Hemsworth, D., & Martínez-Lorente, A.R. (2005). The effect of supplier development initiatives on purchasing performance: a structural model. *Supply Chain Management: An International Journal*, 10(4), 289 – 301

Simpson, P.M., Siguaw, J.A., & White, S.C. (2002). Measuring the performance of suppliers: an Analysis of evaluation processes. *The Journal of Supply chain management: A global review of purchasing and supply*, 29-41

Spekman, RE. & Carraway, R (2006). Making the transition to collaborative buyer-seller relationships: an emerging framework. *Industrial Marketing Management,* 35(1), 10-19

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics*, 5th ed. Boston: Allyn and Bacon.

Vonderembse, M.A. & Tracey, M. (1999). The impact of supplier selection criteria and supplier involvement on manufacturing performance. *The Journal of Supply chain management: A global review of purchasing and supply*, 33-39

Wagner, S.M. (2006a). A firm's responses to deficient suppliers and competitive advantage. *Journal of Business Research,* 59, 686-695

Wagner, S.M. (2006b). Supplier development practices: an exploratory study. *European Journal of Marketing*. 4(5/6), 554-571

Watts, C.A. & Hahn, C.K. (1993). Supplier development programs: an empirical analysis. *International Journal of Purchasing and Materials Management,* 29, 11-17

Williamson Oliver, E. (1985). *The Economic Institutions of Capitalism*. New York: The Free Press

Wu, W.Y., Chiag, C.Y., Wu, Y.F., & Tu, H.F. (2004). The influencing factors of commitment and business integration on supply chain management. *Industrial Management & Data Systems*, 104(4), 322-333

Xiao, Y., Zheng, X., Pan, W., & Xie, X.X.(2010). Trust, relationship commitment and cooperative performance: supply

chain management. *Chinese management studies,* 4, 231-243

Table 1. Average variance extracted and shared variance estimates

	Supplier Development	Buyer-Supplier Relationship	Transaction-Specific Investment	Performance Improvements
SD	**0.680**	0.228	0.068	0.320
BSR	0.477	**0.512**	0.388	0.426
TSI	0.260	0.623	**0.524**	0.229
PERF	0.566	0.653	0.479	**0.516**

Note: Correlations are below the diagonal, square correlations are above the diagonal, and AVE estimates are presented on the diagonal

Table 2. Structural measurement model fit indices with recommended value

Fit statistic	Structural model	Recommended values
Chi-square (χ^2)	117.839	
Chi-square / d.f.	1.215	≤ 2 (Tabachnick and Fidell, 2007)
d.f.	97	
RMSEA	0.035	≤ 0.05 good fit (Browne and Cudeck, 1993)
CFI	0.982	≥ 0.95 good fit (Hu and Bentler,1999)
GFI	0.925	≥ 0.9 (Bagozzi and Yi, 1988)

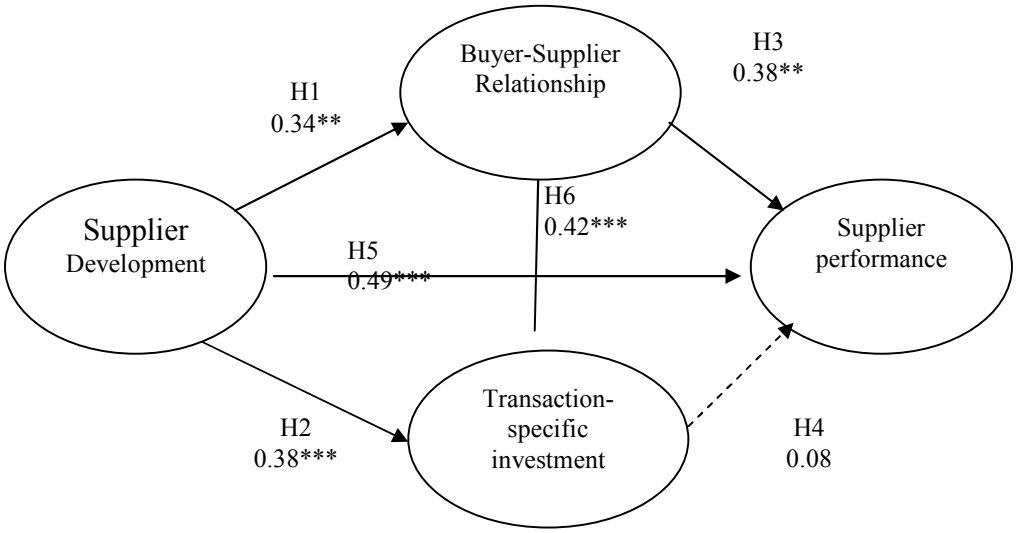

Figure 1. Results of structural model equation model
Solid paths indicate significant results. Dashed paths indicate non-significant results. Levels of significance as follows: ** ($p < 0.01$), *** ($p<0.001$)